image

AF/1634

ARNOLD & PORTER

202.942.5000
202.942.5999 Fax
555 Twelfth Street, NW
Washington, DC 20004-1206

January 12, 2004

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Art Unit: 1634
Examiner: J.C. Switzer
Conf. No.: 4196

Re: U.S. Patent Application Serial No. 09/552,087
Filed: April 21, 2000
Inventors: Joseph R. BYRUM *et al.*
Title: Nucleic Acid Molecules and Other Molecules Molecules Associated with Plants
Atty. Docket: 16517.132

Sir:

Transmitted herewith for appropriate action by the U.S. Patent and Trademark Office (PTO) are the following documents:

1. Appellant's Brief (in triplicate), with attached Appendix A; and
2. Return postcard.

It is respectfully requested that the attached postcard be stamped with the date of filing of these documents, and that it be returned to our courier.

Authorization is hereby given to charge the statutory fee of $330.00 for filing Appellant's Brief to Arnold & Porter Deposit Account No. 50-2387, referencing docket number 16517.132. A duplicate copy of this letter is enclosed.

In the event that extensions of time beyond those petitioned for herewith are necessary to prevent abandonment of this patent application, then such extensions of time are hereby petitioned. Applicants do not believe any additional fees are due in conjunction with this filing. However, if any fees under 37 C.F.R. § 1.16 or § 1.17 are required in the present application, including any fees for extensions of time, then the Commissioner is hereby authorized to charge such fees to Arnold & Porter Deposit Account No. 50-2387, referencing docket number 16517.132. A duplicate copy of this letter is enclosed.

Sincerely,

David R. Marsh (Reg. No. 41,408)
Holly Logue Prutz (Reg. No. 47,755)

Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:			
Joseph R. BYRUM *et al.*		Art Unit:	1634
Appln. No.:	09/552,087	Examiner:	Juliet Caroline SWITZER
Filed:	April 21, 2000	Atty. Docket:	16517.132
For:	Nucleic Acid Molecules and Other Molecules Associated with Plants	Confirmation No.	4196

APPELLANT'S BRIEF

Mail Stop Appeal Brief – Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This is an Appeal from the Final Rejection of all claims pending in the above-captioned patent application. A Notice of Appeal was filed on November 10, 2003. Authorization to charge the official fees for this filing is given in the accompanying transmittal letter. *This Brief is submitted in triplicate.*

1. Real Party in Interest

The real party in interest is Monsanto Company, a Delaware corporation with offices at 800 North Lindbergh Boulevard, St. Louis, Missouri 63167.

2. Related Appeals and Interferences

Appellant is unaware of any Appeals or Interferences related to this Appeal.

3. Status of Claims

Claims 3, 5-7, 9, 10 and 12-20 are pending. Claims 3, 5-7, 9, 10 and 12-20 stand finally rejected under 35 U.S.C. §§ 101 and 112, first paragraph. Further, claim 3, 5-7, 9, 10 and 12-20 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claim 1-9 of copending Application No. 09/421,106.[1] Appellant appeals the rejections of claims 3, 5-7, 9, 10 and 12-20 under 35 U.S.C. §§ 101 and 112, first paragraph.

4. Status of Amendments

Applicants filed an Amendment After Final Rejection ("Amendment") on October 7, 2003, requesting amendment of claims 5, 6 and 12. The Amendment was filed in response to the Final Office Action ("Final Action"), which was mailed on August 11, 2003 (Paper No. 8). In response to Applicants' Amendment, an Advisory Action was mailed by the U.S. Patent and Trademark Office on October 16, 2003 ("Advisory Action"), stating that "[f]or purposes of Appeal, the proposed amendment(s) will be entered...."[2]

5. Summary of Invention

The invention is directed to a transformed plant cell having a nucleic acid molecule which comprises: (A) an exogenous promoter region which functions in said cell to cause the production of a mRNA molecule, wherein said promoter nucleic acid molecule comprises SEQ ID NO: 1 or a complement thereof; which is linked to (B) a structural nucleic acid molecule encoding a protein or peptide; which is linked to (C) a 3' non-translated sequence that functions in said cell to cause termination of transcription

---

[1] Applicants have previously requested that the provisional obviousness-type double-patenting rejection be held in abeyance until patentable subject matter is indicated and reiterate that request herein.

[2] Applicants believe that the entered amendments overcome the Examiner's objection under 37 C.F.R. § 1.75 that if claims 5 and 6 are found allowable that claims 9 and 10 would be substantial duplications.

and addition of polyadenylated ribonucleotides to a 3' end of said mRNA molecule. Specification at page 16, line 12 through page 23, line 23 and page 71 at line 10 through page 80, line 19. The invention is also directed to transformed plants having a nucleic acid molecule comprising (A) an exogenous promoter region which functions in a plant cell to cause the production of a mRNA molecule, wherein said promoter nucleic acid molecule comprises SEQ ID NO: 1, or a complement thereof; which is linked to (B) a structural nucleic acid molecule encoding a protein or peptide; which is linked to (C) a 3' non-translated sequence that functions in a plant cell to cause termination of transcription and addition of polyadenylated ribonucleotides to a 3' end of said mRNA molecule. *Id.* The invention is also directed to a substantially purified nucleic acid molecule that has between 100% and 70% identity with a nucleic acid sequence of SEQ ID NO: 1. Specification at page 25, line 3 through 9. The invention is also directed to a substantially purified nucleic acid molecule comprising a nucleic acid sequence of SEQ ID NO: 1. Specification at page 9, line 12 through 14. The invention also directed to a substantially purified nucleic acid molecule consisting of a nucleic acid sequence of SEQ ID NO: 1. *Id.*

6. Issues

The issues in this Appeal are:

(a) whether claims 3, 5-7, 9, 10 and 12-20 are unpatentable under 35 U.S.C. § 101 for allegedly being unsupported by a specific asserted utility or a well established utility;

(b) whether claims 3, 5-7, 9, 10 and 12-20 are unpatentable under 35 U.S.C. § 112, first paragraph, for alleged lack of enablement because the claimed invention purportedly lacks utility; and

(c) whether claims 12-19 are unpatentable under 35 U.S.C. § 112, first paragraph, for alleged insufficiency of written description.

7. Grouping of Claims

Independent claims 3, 7 and 12 remain in this case. Each claim is independent, and they do not stand or fall together. The patentability of claims 3, 5, 7-9, 10 and 12-20 is addressed together in Sections 8.A through 8.C below. The separate patentability of claim 12-19 is addressed in Section 8.D below. A copy of the claims on appeal is attached hereto as Appendix A.

8. Argument

A. Summary of Appellant's Position

As the Supreme Court said in *Brenner v. Manson*, the "basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility...where specific benefit exists in currently available form." 383 U.S. 519, 534-35, 148 U.S.P.Q. 689, 695 (1966). Applicants have met their part of the bargain – for example, they have disclosed nucleic acid molecules which, in their current form, provide at least one specific benefit to the public, for example use to identify the presence or absence of a polymorphism in a population of soybean plants. This benefit is specific, not vague or unknown, and it is a "real world" or substantial benefit. Because the claimed nucleic acid molecules provide at least these benefits, they satisfy the utility requirement of 35 U.S.C. § 101. Because the specification teaches how to make and use the claimed nucleic acid molecules for the disclosed utilities, the enablement requirement of 35 U.S.C. § 112 has been met.

Furthermore, Applicants have provided an adequate description of the claimed nucleic acid molecules that demonstrates Applicants' possession of the claimed invention. The genus of claimed nucleic acid molecules, *e.g.*, the genus of nucleic acid molecules comprising the nucleic acid sequence of SEQ ID NO: 1, for example, have been described by the recitation of common structural features, *e.g.*, the nucleotide

sequence of SEQ ID NO: 1, which distinguishes molecules in the claimed genus from molecules not in the claimed genus. Because the specification demonstrates that Applicants had possession of (and have provided an adequate description of) the claimed genera of nucleic acid molecules, the specification satisfies the written description requirement of 35 U.S.C. § 112.

B. The Claimed Nucleic Acids Have Legal Utility

Claims 3, 5-7, 9, 10 and 12-20 were erroneously rejected under 35 U.S.C. § 101 as allegedly not supported by a "specific, substantial, and credible utility or by a well established utility." Final Action, at page 3. The Examiner admits that the specification discloses that the nucleic acid molecules of the present invention can be used in "genetic mapping studies (p. 35), physical mapping (p. 43), contig mapping (p. 46), comparative mapping (p. 49-56), the identification of polymorphisms (p. 49-56), monitoring expression (p. 56), locating regions of identity by descent between individuals (p. 58), isolating clones (p. 59), microarray based methods (p. 60), direct site mutagenesis (p. 60), transformation (p. 62-80), in cosuppression (p. 80), to reduce gene function (p. 82), and as antibodies (p. 83)." *Id.*, at page 4. However, the Examiner asserts these utilities are not specific "because the disclosed uses are generally applicable to broad classes of this subject matter." *Id.*, at page 3. The Examiner goes on to assert that "[i]n addition, further characterization of the claimed subject matter would be required to identify or reasonably confirm a 'real world' use." *Id.*, at pages 3-4.

This analysis misstates the nature of the asserted uses, ignores disclosed utilities, and misapplies the doctrine of "practical utility" developed by the courts after *Brenner v. Manson.* The "threshold for utility is not high: An invention is 'useful' under section 101 if it is capable of providing some identifiable benefit." *Juicy Whip, Inc. v. Orange Bang, Inc.*, 185 F.3d 1364, 1366, 51 U.S.P.Q.2d 1700, 1702 (Fed. Cir. 1999), *citing Brenner v.*

Manson, 383 U.S. 519, 534 (1966). Furthermore, an invention need only provide one identifiable benefit to satisfy 35 U.S.C. § 101. *See Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 958, 220 U.S.P.Q. 592, 598 (Fed. Cir. 1983) ("when a properly claimed invention meets at least one stated objective, utility under section 101 is clearly shown").

The courts have expressed a test for utility that hinges on whether an invention provides an "identifiable benefit." *Juicy Whip*, 185 F.3d at 1366, 51 USPQ.2d at 1702. For analytical purposes, the requirement for an "identifiable benefit" may be broken into two prongs: (1) the invention must have a specific, *i.e.*, not vague or unknown benefit, *In re Brana*, 51 F.3d 1560, 1565, 34 U.S.P.Q.2d 1436, 1440 (Fed. Cir. 1995); and (2) the invention must provide a real world, *i.e.*, practical or "substantial" benefit. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1563, 39 U.S.P.Q.2d 1895, 1899 (Fed. Cir. 1996). A corollary to this test for utility is that the invention must not be "totally incapable of achieving a useful result," *i.e.*, the utility must not be incredible or unbelievable. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571, 24 U.S.P.Q.2d 1401, 1412 (Fed. Cir. 1992).

Applicants have asserted in the specification that the claimed nucleic acid molecules provide identifiable benefits, for example, use as regulatory elements, use to identify the presence or absence of a polymorphism, and use as a hybridization probe for monitoring expression. *See, e.g.*, specification at page 16, line 11, through page 23, line 23 and specification at page 49, line 3, through page 57, line 2. Any of these utilities described alone is enough to satisfy Section 101. Because Applicants need only establish a single utility to satisfy 35 U.S.C. § 101, and have done so in the present case, the premise of the rejection under Section 101 is incorrect, and the rejection should be reversed.

(1) The Claimed Nucleic Acid Molecules Provide A Specific Benefit, *i.e.*, They Have Specific Utility

The Examiner acknowledges that the specification describes multiple utilities for the present invention, including "genetic mapping studies, physical mapping, contig mapping, comparative mapping, the identification of polymorphisms, monitoring expression, locating regions of identity by descent between individuals, isolating clones, microarray based methods, direct site mutagenesis [sic], transformation, in cosuppression, to reduce gene function, and as antibodies." Final Action, at page 4 (citations omitted). Moreover, the specification also discloses additional utilities for the claimed nucleic acid molecules,[3] including use of the claimed nucleic acid molecules to measure the level of mRNA in a sample,[4] and use as molecular markers.[5]

(a) Identifying the Presence or Absence of a Polymorphism

For example, one of the utilities disclosed in the specification is use of the claimed nucleic acid molecules to identify the presence or absence of a polymorphism. Specification at page 49, line 3 through page 56, line 15. The Examiner argues that this utility, like many of the asserted utilities, is not specific or substantial, *see, e.g.,* Final Action at page 3, but does not provide any support (legal or factual) for the proposition

---

[3] It is irrelevant whether the corresponding mRNA or polypeptide have utility because Applicants are not relying on utility of the mRNA or polypeptide to establish utility of the claimed nucleic acid molecules.

[4] It is standard practice to screen populations of nucleic acids with EST sequences, often attached to a microarray, without characterizing each and every target mRNA. Knowing that the gene corresponding to the claimed nucleic acid molecules is expressed under certain conditions or in certain tissues or at certain levels is in itself useful. For example, such information is useful to detect expression changes in traits of interest, *e.g.*, fiber quality and/or yield.

[5] One can use the claimed nucleic acid molecules to determine location of a corresponding DNA sequence on a physical map or genetic map location without knowing anything beyond the claimed sequence. The use of molecular markers is a practical activity in the development of nutritionally enhanced or agriculturally enhanced crops. Such markers are useful in, for example, genetic mapping or linkage analysis, marker-assisted breeding, physical genome mapping, transgenic crop production, crop monitoring diagnostics, and gene identification and isolation. As more markers are identified, genetic maps will become more detailed and it will be easier for plant breeders to breed for particular traits.

that detection of polymorphisms using the claimed nucleic acid molecules is not a legal utility.

Many of the disclosed utilities in this case, including the detection of polymorphisms, are directly analogous to the utilities of a microscope, *i.e.*, the claimed nucleic acid molecules may be used to locate and measure nucleic acid molecules within a sample, cell, or organism. The Examiner denigrates such utilities by asserting that these utilities are not "useful" because "[n]o specific function of the polypeptide encoded by SEQ ID NO: 1 has been provided, nor has it been demonstrated that SEQ ID NO: 1 has any utility as a marker for a specific phenotypic trait." Final Action, at page 6. However, the fact that, *e.g.*, a new and nonobvious microscope or screening assay can be used for learning about products or processes does not lessen the fact that such "tools" have legal utility. "Many research tools such as gas chromatographs, screening assays, and nucleotide sequencing techniques have clear, specific and unquestionable utility (*e.g.*, they are useful in analyzing compounds)." MPEP § 2107.01 at page 2100-33.

Use of the claimed nucleic acid molecules to detect the presence or absence of polymorphisms is no more legally insufficient than using a gas chromatograph to analyze the chemical composition of a gas – such use determines information about the gas, not the gas chromatograph. Even if the gas chromatograph detects the absence of a particular chemical element in the gas, that finding does not obviate the utility of the gas chromatograph itself. Information has been obtained about the gas.[6] Likewise, the claimed nucleic acid molecules have utility even if the absence of a particular

---

[6] For example, gas sampled from crude oil may be analyzed by gas chromatography for the presence or absence of chlorine, which is toxic to catalysts used in gasoline refining even in very low concentrations. The absence of a peak at the molecular weight of chlorine indicates the absence of chlorine in the sample being tested, thereby providing useful information (no chlorine is present, therefore the catalyst will not be destroyed) to the refinery manager. *See, e.g.*, U.S. Patent No. 6,133,740 entitled "Chlorine Specific Gas Chromatographic Detector."

polymorphism is detected. Indeed, the absence of a polymorphism usefully demonstrates that the two (or more) populations being compared share a common genetic heritage.

The claimed nucleic acid molecules have been asserted to work for a specific, *i.e.*, not vague or unknown benefit, to identify the presence or absence of a polymorphism. This benefit is immediately realized directly from the use of the claimed nucleic acids, not from the use of other molecules. Such a proven use that provides an acknowledged known benefit to the public satisfies the utility requirement of 35 U.S.C. § 101.

(b) Probes for Other Molecules or Source for Primers

Other uses for the claimed nucleic acid molecules are as probes for other molecules or as a source of primers. The Examiner suggests that these uses are not legal utilities because "[u]tilities that require or constitute carrying out further research to identify or reasonably confirm a 'real world' context of use are not substantial utilities...." Final Action, at pages 6. This is not correct. The specification discloses that the claimed nucleic acid molecules can be used to isolate nucleic acid molecules of other plants and organisms such as alfalfa, *Arabidopsis*, barley, *Brassica*..., sunflower, oil palm, and *Phaseolus*, etc.[7] Specification at page 25, lines 18 through 23. The Examiner has not provided any evidence that would reasonably suggest that this cannot be done, and thus has not met the burden of proof required to establish a utility rejection. *See In re Brana*, 51 F.3d 1560, 1567, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995). *Accord In re Gaubert*, 524 F.2d 1222, 1225-26, 187 U.S.P.Q. 664, 666 (C.C.P.A. 1975); *In re Langer*, 503 F.2d 1380, 1391, 183 U.S.P.Q. 288, 297 (C.C.P.A. 1974).

[7] Furthermore, one skilled in the art of hybridization and amplification understands how to design and utilize probes and primers to target a sequence of interest, and therefore it is not necessary for Applicants to provide a laundry list of each and every nucleic acid molecule that can be identified using the claimed nucleic acid molecules.

One illustrative example of a molecule that can be isolated using a claimed nucleic acid molecule is the promoter of the gene corresponding to that claimed nucleic acid molecule. Applicants have specifically disclosed that one use of the claimed nucleic acid molecules is to initiate a chromosome walk or alternatively in chromosome landing. Specification at page 43, line 4, through page 46, line 21. The Examiner denigrates that utility by asserting that it is not specific because it is generally applicable to any nucleic acid. Final Action at page 5. This is not correct. The claimed nucleic acid molecules are particularly useful, for example, to identify markers and isolate promoters in soybean plants. *See, e.g.*, specification at page 35, line 18 through page 49, line 2.

In short, the Examiner suggests that the asserted utilities are legally insufficient simply because other molecules can be used for the same purpose, *e.g.*, chromosome walks. That position is wrong as a matter of law – there is no requirement of exclusive utility in the patent law. *See Carl Zeiss Stiftung v. Renishaw PLC*, 945 F.2d 1173, 1180, 20 U.S.P.Q.2d 1094, 1100 (Fed. Cir. 1991) ("An invention need not be the best or the only way to accomplish a certain result..."). Such an argument would imply that a new golf club has no legal utility because other golf clubs can be used for the same purpose, *i.e.*, hitting golf balls. That position must be rejected as it requires reading "into the patent laws limitations and conditions which the legislature has not expressed," a practice condemned by the Supreme Court. *See Diamond v. Chakrabarty*, 447 U.S. 303, 308, 206 U.S.P.Q. 193, 196 (1980), *quoting United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 199, 17 U.S.P.Q. 154, 162 (1933).

Moreover, it is factually incorrect that this use is not "specific" to the claimed nucleic acid molecules. The claimed nucleic acid molecules provide a particularly appropriate and demonstrably useful starting point for a walk to isolate genes in soybean plants. *See, e.g.*, specification at page 43, line 1 through page 45, line 11. A random nucleic acid molecule does not provide an equally good starting point to isolate such

genes. Furthermore, even if a random nucleic acid molecule provided a better starting point than the claimed nucleic acid molecules, it would not obviate the utility of the claimed nucleic acid molecules. An invention may be "less effective than existing devices but nevertheless meet the statutory criteria for patentability." *Custom Accessories, Inc. v. Jeffrey-Allan Indus.*, 807 F.2d 955, 960 n.12, 1 U.S.P.Q.2d 1196, 1199 n.12 (Fed. Cir. 1986).

The Examiner has failed to provide evidence, or even to suggest a reason for believing that the claimed nucleic acid molecules could not be so used. Accordingly, the assertion of this utility as a probe for other molecules or as a source of primers satisfies the requirements of 35 U.S.C. § 101. *See In re Brana*, 51 F.3d 1560, 1566, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995).

(c) Use Nucleic Acid Molecules as Regulatory Elements

The specification also discloses additional uses for the claimed nucleic acid molecules as promoters. The Examiner argues that these uses are not legal utilities because "...further experimentation would be required to reasonably confirm that SEQ ID NO: 1, or its complement, or fragments of either would function as a promoter..." and that "[t]he specification does not provide any guidance as to the use of SEQ ID NO: 1, its complements or fragments thereof as promoters." Final Action at page 6. This is not correct. The specification discloses that the claimed nucleic acid molecules have promoter regions or partial promoter regions. Specification at page 16, line 12 through page 23, line 23. In addition, the specification provides ample guidance to the skilled artisan to use the nucleic acid molecules of the present invention in the preparation of constructs for use in transformation of plant cells and the regeneration of plants. *See, e.g.*, Specification at page 62, line 10 through page 80, line 19. The Examiner has not provided any evidence that would reasonably suggest that this cannot be done, and thus

has not met the burden of proof required to establish a utility rejection. *See In re Brana*, 51 F.3d 1560, 1567, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995). *Accord In re Gaubert*, 524 F.2d 1222, 1225-26, 187 U.S.P.Q. 664, 666 (C.C.P.A. 1975); *In re Langer*, 503 F.2d 1380, 1391, 183 U.S.P.Q. 288, 297 (C.C.P.A. 1974).

The Examiner has failed to provide evidence, or even to suggest a reason for believing that the claimed nucleic acid molecules could not be used as promoters. Accordingly, the assertion of this utility satisfies the requirements of 35 U.S.C. § 101. *See In re Brana*, 51 F.3d 1560, 1566, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995).

(2) The Claimed Nucleic Acid Molecules Provide Practical, Real World Benefits, *i.e.*, They Have Substantial Utility

The Final Action also appears to assert that the disclosed uses are legally insufficient because they are not "substantial" utilities. Final Action at pages 3-7. The touchstone of "substantial" utility is "real world" or "practical utility." *See, e.g., Fujikawa v. Wattanasin*, 93 F.3d 1559, 1563, 39 U.S.P.Q.2d 1895, 1899 (Fed. Cir. 1996). " 'Practical utility' is a shorthand way of attributing 'real world' value to claimed subject matter. In other words, one skilled in the art can use a claimed discovery in a manner which provides some immediate benefit to the public." *Nelson v. Bowler*, 626 F.2d 853, 856, 857, 206 U.S.P.Q. 881, 883 (C.C.P.A. 1980) ("tests evidencing pharmacological activity may manifest a practical utility even though they may not establish a specific therapeutic use").[8]

There can be no question that one skilled in the art can use the claimed nucleic acid molecules in a manner which provides an immediate benefit to the public, for example to detect the presence or absence of polymorphisms. The detection of

[8] *Accord Cross v. Iizuka*, 753 F.2d 1040, 1050, 224 U.S.P.Q. 739, 747-48 (Fed. Cir. 1985); *Rey-Bellet v. Engelhardt*, 493 F.2d 1380, 1383, 181 U.S.P.Q. 453, 454 (C.C.P.A. 1974).

polymorphisms provides an immediate benefit to the public because, *e.g.*, it enables a plant breeder to determine the distribution of parental genetic material in the progeny of a cross. This information about a plant's genetic profile, like the information about a compound's pharmacological profile in *Nelson*, provides an immediate benefit and thus a practical utility to the public.

Quite apart from the detection of polymorphisms, there is also no question that the public has recognized the benefits provided by the claimed subject matter, and has attributed "real world" value to such nucleic acid molecules. The utility of BACs and ESTs is not merely an academic issue; the real world value of these constructs is self-evident from the growth of a multi-million dollar industry in the United States premised on their usefulness. Like fermentation processes involving bacteria, ESTs and nucleic acid molecules with EST sequences are "industrial product[s] used in an industrial process – a useful or technical art if there ever was one." *In re Bergy*, 563 F.2d 1031, 1038, 195 U.S.P.Q. 344, 350 (C.C.P.A. 1977).

The market participants for EST products are primarily sophisticated corporations and highly knowledgeable scientists who are unlikely to pay for useless inventions. *Cf. Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 960, 220 U.S.P.Q. 592, 599 (Fed. Cir. 1983) ("People rarely, if ever, appropriate useless inventions"). Quite simply, the commercial value of these products is proof of their real world value and of the benefits they provide to the public. This evidence cannot be ignored. The patent system was created to serve and foster growth and development in the industrial arts. If the industries themselves recognize and appreciate the value of an invention, it is not for the Patent Office to say that they are mistaken.

(3) The Disclosed Utilities Are Credible to One of Skill in the Art

An assertion of utility must be accepted by the Examiner unless it would not be considered "credible" by a person of ordinary skill in the art. MPEP § 2107 at 2100-29. Cases in which utility was found not to be credible are rare, and usually involve "hare-brained" utilities.[9] A challenge to the credibility of a utility is essentially a challenge directed to operability, and such a challenge must be supported by a clear statement of "factual reasons which would lead one skilled in the art to question the objective truth of the statement of operability." *In re Gaubert*, 524 F.2d 1222, 1225-26, 187 U.S.P.Q. 664, 666 (C.C.P.A. 1975); *see In re Brana*, 51 F.3d 1560, 1567, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995); MPEP § 2107.02 at 2100-41.

Applicants have explicitly identified specific and substantial utilities, not only in the specification, but in Applicants' Response dated February 19, 2002, at pages 8-11 and in Applicants' Response dated January 7, 2003, at pages 6-10. "To violate [35 U.S.C.] 101 the claimed device must be totally incapable of achieving a useful result." *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1571, 24 U.S.P.Q.2d 1401, 1412 (Fed. Cir. 1992). To date, the Examiner has provided no evidence that the claimed nucleic acid molecules will not work for the disclosed utilities. Unless and until the

---

[9] Examples of incredible utilities are given in MPEP § 2107.01 at page 2100-34, and include:

> an invention asserted to change the taste of food using a magnetic field (*Fregeau v. Mossinghoff*, 776 F.2d 1034, 227 U.S.P.Q. 848 (Fed. Cir. 1985)), a perpetual motion machine (*Newman v. Quigg*, 877 F.2d 1575, 11 U.S.P.Q. 1340 (Fed. Cir. 1989)), a flying machine operating on "flapping or flutter function" (*In re Houghton*, 433 F.2d 820, 167 U.S.P.Q. 687 (C.C.P.A. 1970)), a method for increasing the energy output of fossil fuels upon combustion through exposure to a magnetic field (*In re Ruskin*, 354 F.2d 395, 148 U.S.P.Q. 221 (C.C.P.A. 1966)), uncharacterized compositions for curing a wide array of cancers (*In re Citron*, 325 F.2d 248, 139 U.S.P.Q. 516 (C.C.P.A. 1963)), a method of controlling the aging process (*In re Eltgroth*, 419 F.2d 918, 164 U.S.P.Q. 221 (C.C.P.A. 1970)), and a method of restoring hair growth (*In re Ferens*, 417 F.2d 1072, 163 U.S.P.Q. 609 (C.C.P.A. 1969)).

Examiner can prove that the claimed invention is wholly inoperative, the rejection must be withdrawn.

In view of the above, Applicants contend that the claimed nucleic acid molecules are supported by credible, specific, and substantial utilities disclosed in the specification. Moreover, the Examiner has failed to raise any credible evidence challenging the presently asserted utilities. Consequently, the rejection of claims 3, 5-7, 9, 10, and 12-20 under 35 U.S.C. §101 is improper and should be reversed.

C. The Claimed Nucleic Acids Are Enabled by the Specification

The enablement of the claimed invention has also been challenged. Claims 3, 5-7, 9, 10, and 12-20 were erroneously rejected as not enabled by the specification, because the claimed invention allegedly lacks utility and therefore cannot be enabled. Final Action at page 8. This rejection is erroneous and has been overcome by the arguments stated above regarding utility because it is well-established law that "the enablement requirement is met if the description enables any mode of making and using the invention." *Johns Hopkins University v. CellPro*, 152 F.3d 1342, 1361, 47 U.S.P.Q.2d 1705, 1719 (Fed. Cir. 1998) (emphasis added), *quoting Engel Indus. v. Lockformer Co.*, 946 F.2d 1528, 1533, 20 U.S.P.Q.2d 1300, 1304 (Fed. Cir. 1991). Unless and until the Examiner comes forth with evidence to rebut the objective truth of the utilities disclosed in the specification, this enablement rejection must be withdrawn as improper. *See In re Wright*, 999 F.2d 1557, 1561-62, 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993); *Ex parte Lemak*, 210 U.S.P.Q. 306, 307 (Bd. App. 1981) ("pure conjecture" does not substantiate rejection for lack of enablement).

The Final Action additionally alleges that "each of the [*Wands*] factors has been carefully considered in the instant grounds of rejection, and it is maintained that undue experimentation would be required by the skilled artisan to use the instant invention."

Final Action at page 8. However, no analysis of these factors has been presented by the Examiner. To the contrary, Applicants assert that an analysis of the criteria presented by *In re Wands* supports Applicants' position that no undue experimentation would be required to make and use the claimed invention for the uses disclosed in the specification. *See In re Wands*, 858 F.2d 731, 737, 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir. 1998).

The first *Wands* criterion is the quantity of experimentation necessary. The "make-and-test" quantum of experimentation is reduced by the extensive knowledge, *e.g.*, of conservative nucleotide substitutions, identification of an active site, and conserved regulatory elements, to which a person of ordinary skill in the art has access. The Examiner generally asserts that undue experimentation would be required by the skilled artisan to use the instant invention. Final Action at page 8. However, one skilled in the art is sufficiently guided by Applicants' disclosure, which sets forth nucleic acid molecules and methods of use thereof in the production of transformed cells and plants. Further, performing routine and well-known steps, such as sequence alignment protocols, transformations and gene expression analysis, cannot create undue experimentation even if it is laborious. *See In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 218-219 (C.C.P.A. 1976).

The second and third *Wands* criteria relate to the amount of direction or guidance given, and the presence or absence of working examples. Again, the specification provides evidence of sequence identity, discloses the identification of promoter regions within the claimed sequences, and discusses the use of the claimed nucleic acid sequence to isolate additional sequences within a genome. *See, e.g.,* Specification at pages 16, line 12 through page 23, line 23, Examples 1-5, the sequence listing and Table 1. Based on such disclosure, one of ordinary skill in the art would be enabled to make and use the invention commensurate in scope with the claims.

The fourth, fifth, and sixth *Wands* criteria focuses on the nature of the invention, the state of the art, and the relative skill in the art. The specification provides a detailed description of the nucleic acid sequences required by the claims, and further describes the preparation of constructs and methods of use related thereto. *See, e.g.*, specification at page 16, line 12 through page 23, line 23 (describing nucleic acid molecules of the present invention as having promoter or partial promoter regions), and page 62, line 10 through page 80, line 19 (describing use of the claimed nucleic acid molecules in methods of transforming plants). Practitioners in this art are guided by considerable knowledge and resources on the conditions and approaches that can be utilized to identify, confirm, and introduce into other hosts, nucleic acid and amino acid sequences.

The seventh criterion considers the predictability of the art. Applicants respectfully assert, as discussed *supra*, that the specification discloses sufficient guidance to render the results of transformations with the claimed nucleic acid molecules predictable. *See, e.g.,* specification at page 62, line 10 through page 80, line 19. Furthermore, the specification provides sufficient guidance to one of skill in the art to decipher the information necessary to make and use the claimed nucleic acid molecules. *See, e.g.,* specification at page 16, line 12 through page 23, line 23 (describing methods that can be used to identify *cis* elements within the claimed nucleic acid molecules), and page 80, lines 4 through 14 (citing references to develop assays for gene expression).

The eighth criterion focuses on the breadth of the claims. Enablement is satisfied when the disclosure "adequately guide[s] the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility". *See In re Vaeck,* 947 F.2d 488, 496, 20 U.S.P.Q.2d 1438, 1445 (Fed. Cir. 1991). In the present case, one of skill in the art is specifically guided by the disclosure to look to, *e.g.*, sequence identity data in making that determination.

The Examiner has not met the evidentiary burden to impose an enablement rejection. A specification that discloses how to use a claimed invention "must be taken as in compliance with the enabling requirement of the first paragraph of § 112 unless there is reason to doubt the objective truth of the statements contained therein." *In re Brana*, 51 F.3d 1560, 1566, 34 U.S.P.Q.2d 1436, 1441 (Fed. Cir. 1995), *quoting In re Marzocchi*, 439 F.2d 220, 223, 169 U.S.P.Q. 367, 369 (C.C.P.A. 1971) (emphasis in original).

The Examiner has provided neither evidence supporting the rejection nor any explanation of why the specification allegedly fails to enable the nucleic acid molecules of claims 3, 5-7, 9-10 and 12-20. *See In re Wright*, 999 F.2d 1557, 1561-62, 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993); *Ex parte Lemak*, 210 U.S.P.Q. 306, 307 (B.P.A.I. 1981) ("pure conjecture" does not substantiate rejection for lack of enablement). Therefore, because the above analysis illustrates that the specification clearly enables at least the methods of making and using the invention as set forth in the Examples, and the claims, the enablement requirement has been satisfied. *Cf. Johns Hopkins University v. CellPro*, 152 F.3d 1342, 1361, 47 U.S.P.Q.2d 1705, 1719 (Fed. Cir. 1998) ("the enablement requirement is met if the description enables any mode of making and using the invention") (emphasis added), *quoting Engel Indus. v. Lockformer Co.*, 946 F.2d 1528, 1533, 20 U.S.P.Q.2d 1300, 1304 (Fed. Cir. 1991). Accordingly, the rejection of claims 3, 5-7, 9-10 and 12-20 under 35 U.S.C. § 112, first paragraph is improper and should be reveresed.

D. The Specification Provides an Adequate Written Description of the Claimed Invention

The adequacy of the written description of claims 12 through 19 has been challenged by the Examiner because the claimed subject matter was allegedly "not described in the specification in such a way as to reasonably convey to one skilled in the

relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." Final Action at pages 8-9. The basis for the Examiner's challenge is that the claims are "drawn to nucleic acids which comprise SEQ ID NO: 1 or a nucleic acid related to SEQ ID NO: 1 by a particular range of identity...." Final Action at page 9. The Examiner alleges that "[t]his large genus is represented in the specification by one species, a nucleic acid sequence consisting of SEQ ID NO: 1." *Id.* This is not a proper basis for a written description rejection of a "comprising" claim. If it was, every "comprising" claim ever written would be invalid for failing to describe every nuance of the claimed invention. Furthermore, the specification demonstrates to one skilled in the art that Applicants were in possession of the claimed genus of nucleic acid molecules.

(1) The Specification Reflects Applicants' Possession of the Claimed Invention

The purpose of the written description requirement is to ensure that the inventors had possession of the claimed subject matter, *i.e.*, to ensure that the inventors actually invented what is claimed. *Gentry Gallery Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479, 45 U.S.P.Q.2d 1498, 1503 (Fed. Cir. 1998); *Lockwood v. American Airlines*, 107 F.3d 1565, 1572, 41 U.S.P.Q.2d 1961, 1966 (Fed. Cir. 1997); *In re Alton*, 76 F.3d 1168, 1172, 37 U.S.P.Q.2d 1578, 1581 (Fed. Cir. 1996). If a person of ordinary skill in the art would, after reading the specification, understand that the inventors had possession of the claimed invention, even if every nuance of the invention was not expressly described, then the written description requirement has been met. *In re Alton*, 76 F.3d at 1175, 37 U.S.P.Q.2d at 1584. After reading the present specification, a person of ordinary skill in the art would understand that Applicants had possession of nucleic acid molecules comprising SEQ ID NO: 1, and therefore, the claimed invention.

Applicants have provided the nucleic acid sequence required by the claims, *i.e.*, SEQ ID NO: 1, as well as, for example, vectors comprising the nucleic acid sequence (*see, e.g.,* specification at page 63, line 6 through page 71, line 5), and conservative amino acid substitutions which may be employed with the nucleic acid molecules of the present invention (*see, e.g.,* specification at page 26, line 11 through page 29, line 13). The fact that the claims at issue are intended to cover molecules that include the recited sequence joined with additional sequences does not mean that Applicants were any less in possession of the claimed nucleic acid molecules.[10] It is well-established that use of the transitional term "comprising" leaves the claims "open for the inclusion of unspecified ingredients even in major amounts." *Ex parte Davis*, 80 U.S.P.Q. 448, 450 (B.P.A.I. 1948). *Accord PPG Indus. v. Guardian Indus.*, 156 F.3d 1351, 1354, 48 U.S.P.Q.2d 1351, 1353-54 (Fed. Cir. 1998); *Moleculon Research Corp. v. CBS*, 793 F.2d 1261, 1271, 229 U.S.P.Q. 805, 812 (Fed. Cir. 1986).

Applicants have provided in the present disclosure not only the nucleotide sequence required by the claims (i.e. SEQ ID NO: 1), but also several variations including and directed to the claimed nucleic acid molecules. For example, the present specification describes vectors comprising the claimed nucleic acid molecules (specification at page 63, line 6 through page 71, line 5), and describes how to make the nucleotide sequences and libraries from which they were originally purified. *See, e.g.*, Examples page 89, *et. seq*. Furthermore, the addition of extra nucleotides or detectable labels to the disclosed nucleotide sequence (SEQ ID NO: 1) is readily envisioned by one

---

[10] If the Examiner is arguing that no possession is shown because the precise claim language is not used in the specification, then she goes beyond what is required by the law. It is well-settled that the description of a claimed invention need not be *in ipsis verbis*. *Gentry Gallery v. Berkline Corp.*, 134 F.3d 1473, 1479, 45 U.S.P.Q.2d 1498, 1503 (Fed. Cir. 1998); *In re Alton*, 76 F.3d 1168, 1175, 37 U.S.P.Q.2d 1578, 1583 (Fed. Cir. 1996); *Martin v. Johnson*, 454 F.2d 746, 751, 172 U.S.P.Q. 391, 395 (C.C.P.A. 1972).

of ordinary skill in the art upon reading the present specification,[11] in particular at page 31, lines 1-6 and page 32, lines 11-18 (describing fusion peptide molecules encoded by the claimed nucleic acid molecules), page 14 lines 11-15 (describing sequences with labels to facilitate detection), page 60, line 16 through page 62, line 9 (describing site-directed mutagenesis) and page 84, lines 11-18 (citing references describing the construction, manipulation and isolation of nucleic acid macromolecules).

Moreover, the court determined, in *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 296 F.3d 1316, 1321, 63 U.S.P.Q.2d 1609, 1610 (Fed. Cir. 2002), that the written description inquiry is a factual one determined on a case-by-case basis and that, in a given disclosure, "it may well be that various subsequences, mutations, and mixtures of those sequences are also described to one of skill in the art." *Enzo*, 296 F.3d at 1326-1327, 63 U.S.P.Q.2d at 1615. Furthermore, it is well established that claims "may be broader than the specific embodiment disclosed in a specification. *Ralston-Purina Co. v. Far-mor-Co*, 772 F.2d 1570, 1575, 227 U.S.P.Q. 177, 179 (Fed. Cir. 1985) (*quoting In reRasmussen*, 650 F.2d 1212, 1215, 211 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

(2) Applicants Have Described the Claimed Invention

The Final Action asserts the claimed subject matter is so "broad so as to encompass a multitude of variants of SEQ ID NO: 1, as well as any full length coding squence, mRNA, promoter, or genomic DNA od which SEQ ID NO: 1 is a portion, or of which the recited polynucleotides with identity to SEQ ID NO: 1 are portions." Final Action at page 9. The Examiner appears to assert that each nucleic acid molecule within the claimed genus must be described by its complete structure. These assertions are

[11] It is established patent jurisprudence that Applicants need not teach "conventional and well-known genetic engineering techniques." *E.g., Ajinomoto Co. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 1345, 56 U.S.P.Q.2d 1332, 1337 (Fed. Cir. 2000).

totally unfounded. The Federal Circuit has elucidated a test for written description wherein a genus of nucleic acids may be described by a structural feature that distinguishes members of the claimed genus from non-members of the claimed genus. *Regents of the University of California v. Eli Lilly and Co.*, 119 F.3d 1559, 1568-69, 43 U.S.P.Q.2d 1398, 1406 (Fed. Cir. 1997). Applicants have satisfied that test for written description.

In particular, Applicants have disclosed structural features, for example, the nucleotide sequences of SEQ ID NO: 1. The respective structural feature (the nucleotide sequences of SEQ ID NO: 1) is shared by every nucleic acid molecule in the claimed genera, and it distinguishes the members of the claimed genus from non-members. For example, if a nucleic acid molecule such as an mRNA contains the nucleotide sequence of SEQ ID NO: 1, then it is a member of the claimed genus of nucleic acid molecules comprising a nucleic acid sequence of SEQ ID NO: 1. If a nucleic acid molecule does not contain SEQ ID NO: 1, then it is not a member of that claimed genus.[12] The presence of other nucleotides at either end of the recited sequence will not interfere with the recognition of a claimed nucleic acid molecule as such – it either contains the nucleotides of SEQ ID NO: 1 or it does not. One skilled in the art, after reading the present specification, would clearly know if a nucleic acid molecule contains the recited nucleotide sequence. Thus, claims 12-19 are supported by an adequate written description pursuant to the requirements of 35 U.S.C. § 112, and the rejection should be reversed.

In light of the detailed disclosure of the present application, one skilled in the art, after reading the present specification, would clearly know if a nucleic acid molecule

[12] This argument applies with equal force to every genus of the claimed nucleic acid molecules. For example, if an mRNA comprises a nucleotide sequence that shares 80% identity with a nucleic acid sequence of SEQ ID NO: 1, then it is a member of that genus of nucleic acid molecules. *See*, claim 13.

comprises a nucleic acid sequence of SEQ ID NO: 1. Thus, the claims are supported by an adequate written description pursuant to the requirements of 35 U.S.C. § 112.

CONCLUSION

In view of the foregoing, it is respectfully requested that the Board of Patent Appeals and Interferences reverse the Rejections and that the subject application be allowed forthwith.

Respectfully submitted,

Date: January 12, 2004

Thomas E. Holsten (Reg. Agent No. 46,098)
Holly Logue Prutz (Reg. Atty. No. 47,755)
David R. Marsh (Reg. Atty. No. 41,408)

ARNOLD & PORTER
555 Twelfth Street, NW
Washington, DC 20004-2402
(202) 942-5000 telephone
(202) 942-5999 facsimile

Of Counsel
Lawrence M. Lavin, Jr.
(Reg. Atty. No. 30,768)
Thomas E. Kelley
(Reg. Atty. No. 29,938)
Monsanto Company

APPENDIX A

3. A transformed plant cell having a nucleic acid molecule which comprises:

(A) an exogenous promoter region which functions in said cell to cause the production of a mRNA molecule, wherein said promoter nucleic acid molecule comprises SEQ ID NO: 1 or a complement thereof; which is linked to

(B) a structural nucleic acid molecule encoding a protein or peptide; which is linked to

(C) a 3' non-translated sequence that functions in said cell to cause termination of transcription and addition of polyadenylated ribonucleotides to a 3' end of said mRNA molecule.

5. A transformed plant cell according to claim 3, wherein said plant cell is a dicot plant cell.

6. A transformed plant cell according to claim 3, wherein said plant cell is a monocot plant cell.

7. A transformed plant having a nucleic acid molecule which comprises:

(A) an exogenous promoter region which functions in a plant cell to cause the production of a mRNA molecule, wherein said promoter nucleic acid molecule comprises SEQ ID NO: 1, or a complement thereof; which is linked to

(B) a structural nucleic acid molecule encoding a protein or peptide; which is linked to

(C) a 3' non-translated sequence that functions in a plant cell to cause termination of transcription and addition of polyadenylated ribonucleotides to a 3' end of said mRNA molecule.

9. The transformed plant according to claim 7, wherein said plant is a dicot.

10. The transformed plant according to claim 7, wherein said plant is a monocot.

12. A substantially purified nucleic acid molecule, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 70% identity with a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.

13. A substantially purified nucleic acid molecule according to claim 12, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 80% identity with a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.

14. A substantially purified nucleic acid molecule according to claim 13, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 90% identity with a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.

15. A substantially purified nucleic acid molecule according to claim 14, wherein said nucleic acid molecule comprises a nucleic acid sequence having between 100% and 95% identity with a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.

16. A substantially purified nucleic acid molecule according to claim 15, wherein said nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.

17. The substantially purified nucleic acid molecule according to claim 12, wherein said nucleic acid molecule further comprises a region having a single nucleotide polymorphism.

18. The substantially purified nucleic acid molecule according to claim 12, wherein said nucleic acid molecule further comprises a promoter or partial promoter region.

19. The substantially purified nucleic acid molecule according to claim 18, wherein said promoter region comprises a CAAT cis element and a TATA cis element and an additional cis element.

20. The substantially purified nucleic acid molecule according to claim 16, wherein said nucleic acid molecule consists of a nucleic acid sequence of SEQ ID NO: 1 or a complement thereof.